to any combinations of surds whose indices do not exceed the number 6, and to as many as *three* surds, neither of whose indices exceed 12, as well as to various others which cannot be concisely specified.

Analysis of a new Species of Copper Ore. *By* Thomas Thomson, *M.D. F.R.S. L. and E.* Read November 18, 1813. [*Phil. Trans.* 1814, *p.* 45.]

The mineral here analysed was brought from the peninsula of Hindostan by Dr. Heyné, where it occurs in considerable quantity along with malachite. Those specimens that are freest from malachite are of a dark blackish brown colour, soft, being easily scratched with a knife, which leaves a streak of a reddish brown. Its specific gravity is 2·62. Its fracture is in general small-conchoidal, but with a tendency in some parts to a foliated fracture; but it has not yet been seen with any appearance of external crystalline form.

It effervesces with acids, which form a blue or green solution according to the acid used, and leaves a red powder undissolved.

One hundred grains treated with dilute sulphuric acid lost 16·7 grains by escape of carbonic acid gas.

One hundred grains having been treated with muriatic acid formed a green solution, from which a clean plate of zinc precipitated 48·5 grains.

The red powder left by cold muriatic acid was digested for several hours in nitro-muriatic acid, which left 2·1 grains of white quartz undissolved, and afforded by ammonia a precipitate of 19·5 grains oxide of iron.

In order to determine the state of the oxide of copper in this ore, Dr. Thomson put 100 grains in fine powder into the bottom of a tall narrow vessel, which he then filled with water, and by means of a funnel poured a quantity of muriatic acid on the ore at the bottom. Since the ore was even in this mode immediately attacked, and formed a solution which from the commencement appeared green, he considers this evidence decisive, that the copper is in the state of black oxide, in which 100 of the metal are combined with 25 oxygen; so that 48·5 of copper precipitated by zinc indicated 60·75 of black oxide in the ore, and the analysis thus conducted gives an amount of ingredients corresponding within one per cent. with the quantity originally taken for experiment.

Since the integrant parts of carbonic acid and of oxide of copper, as the author has elsewhere shown, are to each other in the ratio of 2·75 to 10, and as this is just the ratio of 16·7 to 60·75, the quantities contained in the ore, there can be no doubt that the carbonic acid and copper are combined in the ore, constituting a carbonate of copper without water, and in that respect differing from both malachite and the blue carbonate, the former of which would appear from Klaproth's analysis to contain two particles of water, and the latter one. So that the present ore may be distinguished by the name of anhydrous carbonate of copper.